BIOLOGICAL EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE OCONEE NATIONAL FOREST, GEORGIA

William H. Hoffard[1/]
Ray S Williams[2/]

ABSTRACT

Within the past 10 weeks, southern pine beetle (SPB) activity on the Oconee National Forest has increased significantly. District-flown aerial surveys, made about every three weeks since August 15, have detected a cumulative total of 80 multiple tree spots (1.0 spot/1,000 acres of host type). Forest Pest Management (FPM) recommends that a suppression project be initiated on the Forest.

INTRODUCTION

In the past 20 years, the Oconee National Forest has experienced 4 SPB epidemics. The first peaked in 1963 and collapsed during the winter of 1964 (Cambre and Padgett, 1964). In 1968, activity again increased, but rapidly subsided (Barry et al., 1968). Three years later, in 1971, high population levels were again reported (Barry et al, 1971). This epidemic prevailed until 1974 (Barber, 1975). In 1979, SPB populations exploded (Hoffard et al, 1979). This epidemic, the worst in recent history, had collapsed by 1981 (Hoffard and Lambert, 1981). An August 1982 evaluation (Hoffard and Carothers) warned of increasing beetle activity, which could become epidemic.

Traditionally, infestations have been most severe in and around the Cedar Creek Wildlife Management Area, where Jones, Putnam, and Jasper Counties intersect (Fig. 1). Severity of infestations at this location may be associated with a high incidence of littleleaf disease (Phytophthora cinnamomi) of shortleaf pine (Pinus echinata).

This evaluation was conducted to determine the present status and trend of southern pine bark beetle infestations and to recommend appropriate pest management strategies.

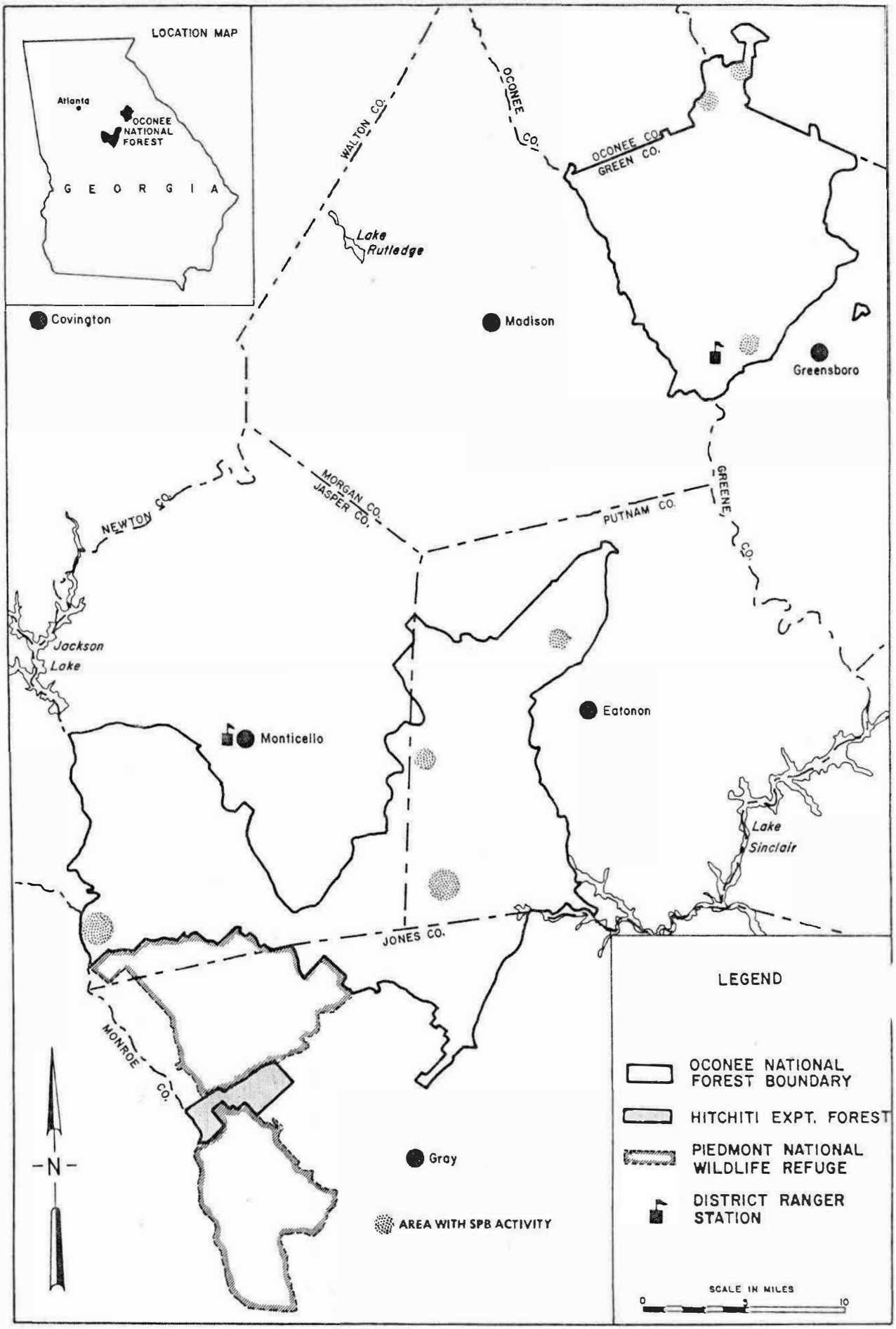
METHODS

This evaluation is based, in part, on aerial survey data provided by the Oconee National Forest in combination with a FPM survey of August 1982.

1/ Entomologist, USDA Forest Service, SA, FPM, Asheville, N.C.

2/ Biological Technician, USDA Forest Service, SA, FPM, Asheville, N.C.

Figure 1.


LOCATION MAP
Atlanta
OCONEE NATIONAL FOREST
G E O R G I A
WALTON CO.
OCONEE CO.
OCONEE CO.
GREEN CO.
Lake Rutledge
Covington
Madison
Greensboro
NEWTON CO.
MORGAN CO.
JASPER CO.
PUTNAM CO.
GREENE CO.
Jackson Lake
Monticello
Eatonon
Lake Sinclair
JONES CO.
MONROE CO.
Gray
AREA WITH SPB ACTIVITY
N
LEGEND
OCONEE NATIONAL FOREST BOUNDARY
HITCHITI EXPT. FOREST
PIEDMONT NATIONAL WILDLIFE REFUGE
DISTRICT RANGER STATION
SCALE IN MILES
0
5
10

Standard, aerial, sketch-mapping techniques were used to conduct the survey. Two observers, viewing a strip .5 miles wide, observed and plotted suspected spots on Class A Ranger District Maps. Flight lines were spaced 1 mile apart, resulting in a 100 percent survey.

This survey procedure was repeated 3 times in a 9-week period. Cumulative, new spot totals were used for infestation selection for ground checking from all three flights. This is because the District's rapid control program precluded normal selection of spots for ground checking based on one flight. It was determined that this survey and evaluation technique would yield meaningful data, while not "penalizing" the District for an aggressive and commendable response following detection of spots. In one particular case, a 120-tree spot was controlled before ground data could be collected. Here, spot data was projected using spot growth models and ratios based on smaller spots.

Spots were selected for ground checks based on size class distribution (no. of red trees/spot). Fourteen spots were selected for collection of ground data.

After locating sample spots, the following data were collected: number of vacated and infested trees by crown color (i.e., green, fading, red, or black), average diameter, and average total height. The presence and status of natural parasites and predators of southern pine bark beetles were noted. The data collected were used to project population trends based, in part, on the ratio of green infested to red infested trees.

RESULTS

A cumulative total of 80 spots was observed during the 3 aerial surveys (Fig. 1). Table 1 shows a summary by size class. Table 2 shows results of the ground survey.

The sampled spots showed a total of 17,350 ft^3 killed by SPB. Of this, 9,755 ft^3, or 56 percent, is currently infested. Fifty percent of all dead volume is in green trees (Fig. 2). As has been shown in previous surveys, much of the activity on the Oconee is concentrated is southern Jasper and Putnam Counties, where littleleaf disease is at its worst.

Despite this surge of relatively new activity, a relatively high level of activity by natural enemies of the SPB was noted. This is especially true for the predators Thanasimus dubius and Scolopsis mississippiensis.

RECOMMENDATIONS AND DISCUSSION

The level of SPB on the Oconee has increased significantly since the last evaluation and has now reached outbreak status. This is part of an epidemic which currently involves much of the South. This outbreak may have been triggered, in part, by sustained drought in 1980 and 1981 (Hoffard and Lambert, 1981).

The inordinately high ratio of green infested to red infested trees (Fig. 2) is a matter of grave concern. Historically, such a high proportion in the late summer foreshadows heavy losses the following spring.

Table 1.--Spots detected aerially by size class distribution (no. of trees), Oconee National Forest, 1982.

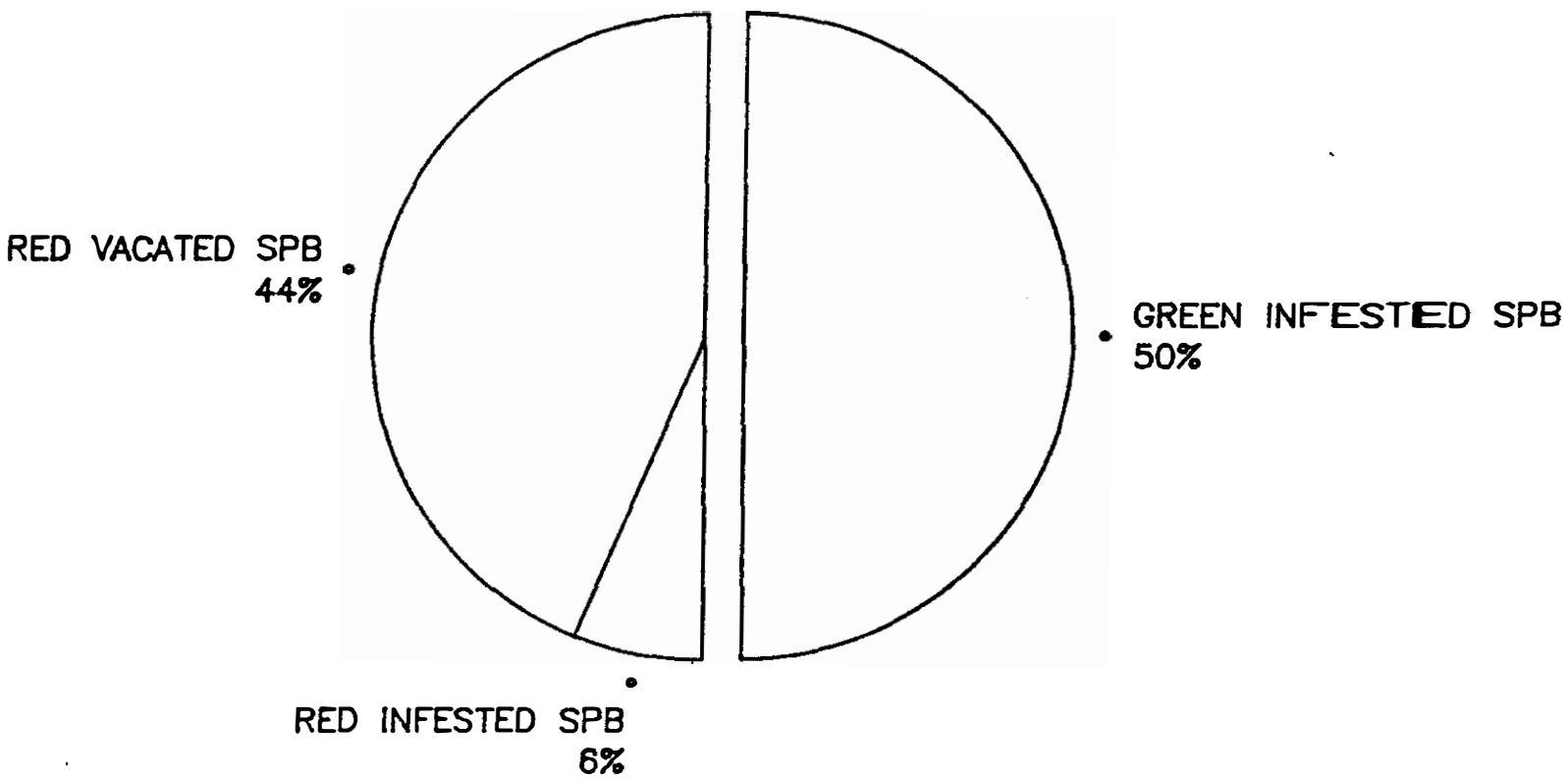
Infestation Size Range (no. of trees)				
1-10	11-25	26-50	51-100	100+
54	17	6	1	2

Table 2.--Summary of ground check data for the Oconee National Forest, August 4 - September 24, 1982.

Spot No.	Aerial Size	No. Vacated Trees			No. Infested Trees			Green:Red Ratio	$\bar{x}$ dbh/$\bar{x}$ ht	$\bar{x}$ age	$\bar{x}$ vol/tree (ft^3)
		Green	Red	Total	Green	Red	Total				
1 1/	120	0	95	95	217	15	232	14.5:1	5.6/40	23	6
2	9	0	29	29	19	0	19	-	9.0/44	30	9
3	5	0	5	5	8	5	13	1.5:1	20.1/93	70	81
4	2	0	5	5	15	1	15	15:1	17.0/93	60	61
5	12	0	2	2	20	1	21	20:1	12.0/54	33	18
6	2	0	2	2	2	0	2	-	10.0/60	45	13
7	2	0	2	0	2	1	3	-	19.1/68	62	54
8	30	0	20	20	17	2	19	8.5:1	18.2/62	70	42
9	4	0	4	4	0	1	1	-	8.0/33	28	6
10	4	0	4	4	4	8	8	1.25:1	15.0/82	60	40
11	4	0	4	4	2	5	7	.4:1	12.3/62	35	19
12 1/	12	0	12	12	2	3	5	.66:1	12.1/60	37	19
13	3	0	3	3	2	2	4	1:1	12.9/56	50	21
14	15	0	15	15	10	5	15	2:1	11.9/59	43	19

1/ These spots were salvaged prior to ground check. Data were projected using modeling data and ratios for smaller spots.

FIG. 2 — — SAMPLED AFFECTED TIMBER BY CONDITION (PERCENT OF VOLUME) , 10/7/82



OCONEE NATIONAL FOREST

At the time of this evaluation, spots were condensed into small areas due to lateness of the season. Therefore, affected volumes used in cost benefit analyses were increased by a factor of 3 to account for anticipated spot proliferation in the spring of 1983.

Detailed information on economic benefits without and with a project are shown in Table 3.

Table 3.--Southern pine beetle economic evaluation for the Oconee National Forest at 4% discount rate.

						WITHOUT A PROJECT				
Age	Harv. Obj.	Volume Lost (MBF)	Spot Growth Rate	Volume Threat (MBF)	Growth Rate (%)	Age at Harv.	Volume at Harvest (MBF)	Price at Harv.	Value at Harvest	Present Value
20	S/F	350	1.38	482	2.6	60	1360	$ 81	$109979	$ 22026
40	S/F	406	1.39	566	1.2	60	725	81	58633	25730
60	S/F	60	1.40	84	.6	60	85	81	6842	6579
Total		817		1132			2170		$175453	$ 54335
								Value of the volume not salvaged (lost)		$ 12589
								Total value lost		$ 66925

Table 3.--con't

WITH A PROJECT

Age	Harv. Obj.	Volume Lost (MBF)	Spot Growth Rate	Volume Threat (MBF)	Growth Rate (%)	Age at Harv.	Volume at Harvest (MBF)	Price at Harv.	Value at Harvest	Present Value
20	S/F	88	1.38	121	2.6	60	340	$ 81	$27495	$ 5507
40	S/F	102	1.39	141	1.2	60	181	81	14658	6433
60	S/F	15	1.40	21	.6	60	21	81	1711	1645
Total		204		283			543		$43863	$13584

Value of the volume not salvaged (lost) $ 3147

Total value lost $16731

Project Benefits:	50194
Total Project Cost:	27000
Net Present Value:	23194
Benefit Cost Ratio:	1.86
Internal Rate of Return:	7.82%
Composite Rate of Return:	5.59%
Targets	
Volume Removed:	817 CCF
Volume Protected:	849 CCF

REFERENCES

Barber, L. R. 1975. Evaluation of southern pine beetle infestations on the Oconee National Forest, Piedmont National Wildlife Refuge, and Hitchiti Experimental Forest, Georgia. USDA Forest Service, SA, S&PF, FPM, Asheville, N.C. Rep. No. 76-1-4. 7 p.

Barry, P. J., W. E. McDowell, and R. F. Bassett. 1968. Evaluation survey of southern pine beetle infestations on the Oconee National Forest, Hitchiti Experimental Forest, and Piedmont National Wildlife Refuge, Georgia. USDA Forest Service, SA, S&PF, FPM, Asheville, N.C. Rep. No. 69-1-3. 8 p.

Barry, P. J. and W. E. McDowell. 1971. Evaluation of southern pine beetle infestations on the Uncle Remus Ranger District, Oconee National Forest, Hitchiti Experimental Forest, and Piedmont National Wildlife Refuge, Georgia. USDA Forest Service, SA. S&PF, FPM, Asheville, N.C. Rep. No. 72-1-15. 8 p.

Bassett, R. F. 1982. Aerial survey of insect and disease activity on the Oconee National Forest, Hitchiti Experimental Forest, and Piedmont National Wildlife Refuge. USDA Forest Service, S&PF, FPM, Doraville, Ga. Rep. No. 82-3-32.

Cambre, L. A. and W. H. Padgett. 1964. Survey of bark beetle infestations on the Oconee National Forest and the Hitchiti Experimental Forest of the National Forests in Georgia and the Piedmont National Wildlife Refuge. USDA Forest Service, SA, S&PF, Zone 2, FPC, Macon, Ga. Rep. No. 2-18-64.

Hoffard, W. H and H. L. Lambert. 1981. Biological evaluation of bark beetle infestations on the Oconee National Forest, Georgia. USDA Forest Service, SA, S&PF, FPM, Asheville, N.C. Rep. No. 82-1-3. 7 p.

Hoffard, W. H. and others. 1979. Biological evaluation of the southern pine beetle infestations on the Oconee National Forest Georgia. USDA Forest Service, SA, S&PF, FPM, Asheville, N.C. Rep. No. 79-1-18.

Hoffard, W. H. and W. A. Carothers. 1982. Biological evaluation of bark beetle infestations on the Oconee National Forest, Piedmont National Wildlife Refuge, and Hitchiti Experimental Forest in Georgia. USDA Forest Service, SA, S&PF, FPM, Asheville, N.C. Rep. No. 82-1-34. 11 p.

Forest Pest Management
Asheville Field Office

Report #83-1-4
October 1982

BIOLOGICAL EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE OCONEE NATIONAL FOREST, GEORGIA

Prepared by: William H. Hoffard CHH
Entomologist

Ray S. Williams
Biological Technician

Approved by: Harold W. Flake
for Harvey V. Toko
Staff Director
Forest Pest Management